HW4_poz3615

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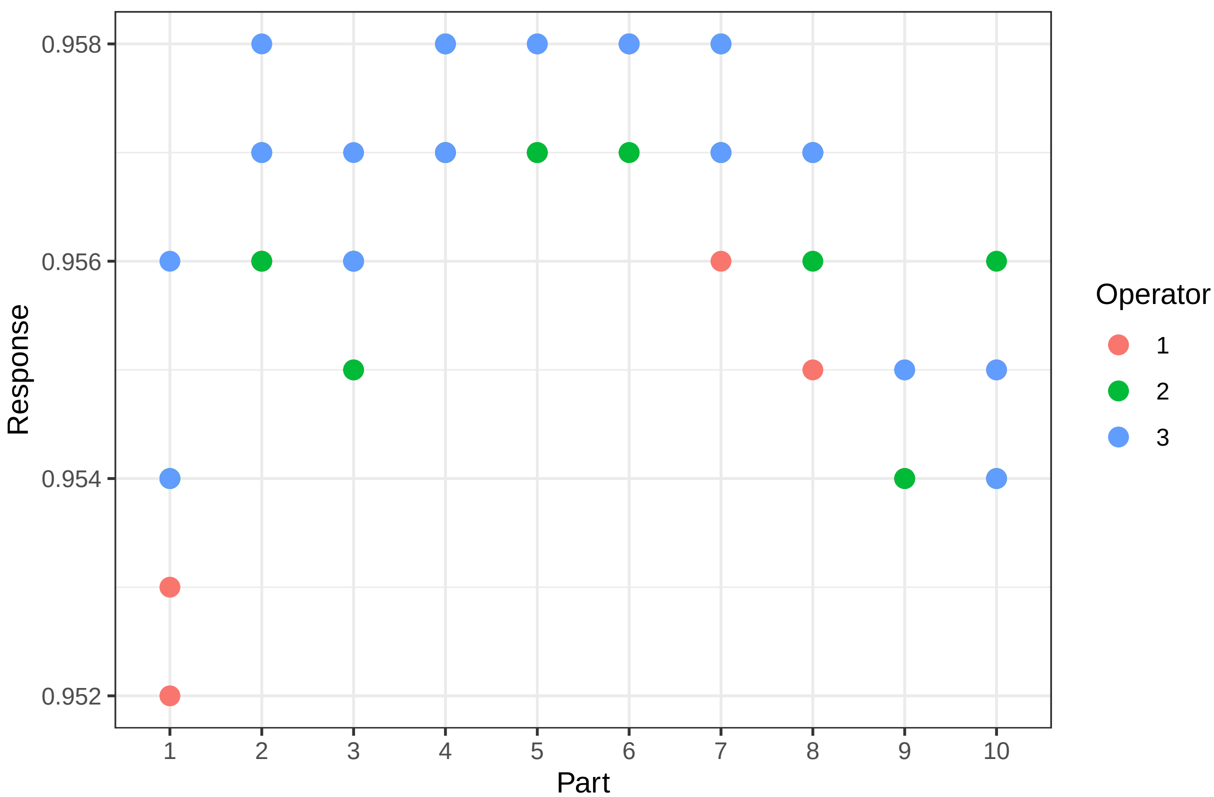
a.

```
 Response Part Operator
    0.953    1        1
    0.956    2        1
    0.956    3        1
    0.957    4        1
    0.957    5        1
    0.958    6        1
    0.957    7        1
    0.957    8        1
    0.954    9        1
    0.954   10        1
    0.952    1        1
    0.956    2        1
    0.955    3        1
    0.957    4        1
    0.957    5        1
    0.958    6        1
    0.956    7        1
    0.955    8        1
    0.954    9        1
    0.955   10        1
    0.954    1        2
    0.956    2        2
    0.956    3        2
    0.958    4        2
    0.957    5        2
    0.957    6        2
    0.958    7        2
    0.957    8        2
    0.954    9        2
    0.956   10        2
    0.954    1        2
    0.957    2        2
    0.955    3        2
    0.957    4        2
    0.957    5        2
    0.957    6        2
    0.957    7        2
    0.956    8        2
    0.954    9        2
    0.954   10        2
```

0.954	1	3
0.958	2	3
0.957	3	3
0.957	4	3
0.958	5	3
0.958	6	3
0.958	7	3
0.957	8	3
0.955	9	3
0.954	10	3
0.956	1	3
0.957	2	3
0.956	3	3
0.958	4	3
0.958	5	3
0.958	6	3
0.957	7	3
0.957	8	3
0.955	9	3
0.955	10	3

Graph of Part and Response by Operator




```
    (Other):24       1       : 6             1:20    1st Qu.:0.9550
                1                  1                 1                 1
    2       : 6             2:20       3       : 6             3:20
                1                  1                 1                 1
3rd Qu.:0.9570       4       : 6       5       : 6       6       : 6
                1                  1                 1                 1
Max.   :0.9580    Mean   :0.9561    Median :0.9570    Min.   :0.9520
```

```
1 1 1 1
```

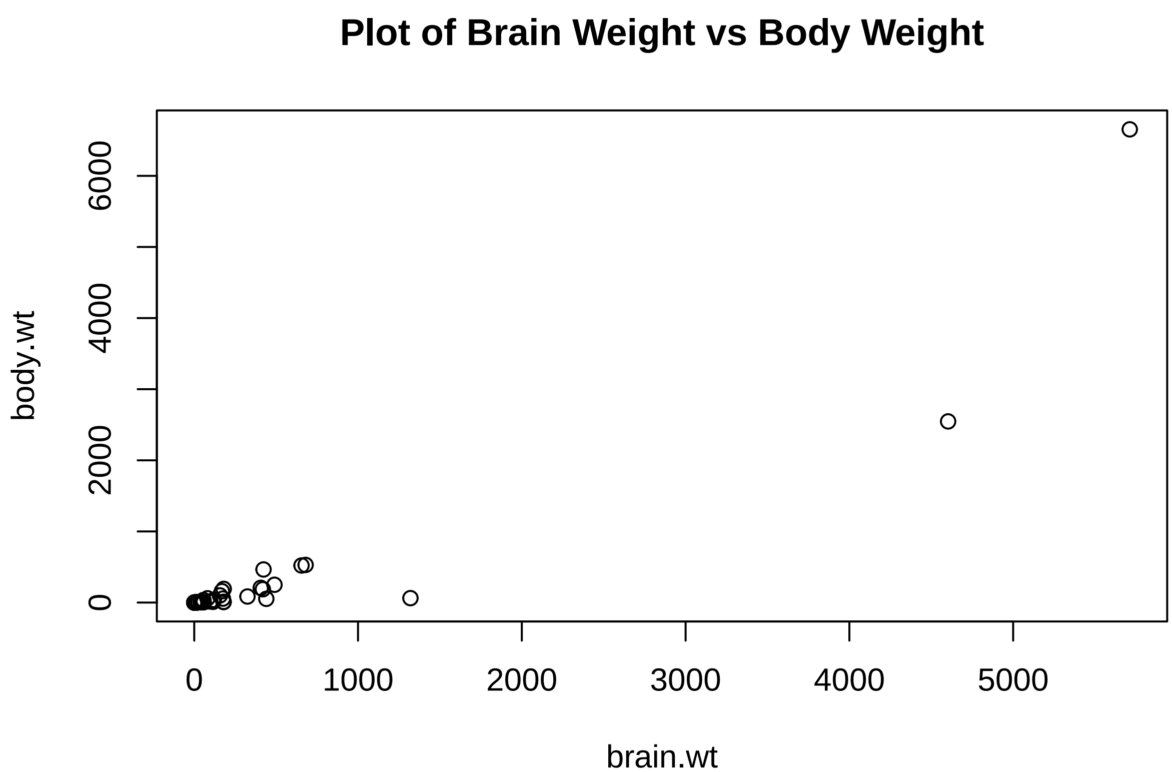
Table 1: Measurements of Wall Thickness by Operator

	Response	Part	Operator
V21	0.953	1	1
V22	0.956	2	1
V23	0.956	3	1
V24	0.957	4	1
V25	0.957	5	1
V26	0.958	6	1

b.

```
 brain.wt  body.wt
   44.50    3.385
   15.50    0.480
    8.10    1.350
  423.00  465.000
  119.50   36.330
  115.00   27.660
   98.20   14.830
    5.50    1.040
   58.00    4.190
    6.40    0.425
    4.00    0.101
    5.70    0.920
    6.60    1.000
    0.10    0.005
    1.00    0.060
   10.80    3.500
   12.30    2.000
    6.30    1.700
 4603.00 2547.000
    0.30    0.023
  419.00  187.100
  655.00  521.000
    3.50    0.785
  115.00   10.000
   25.60    3.300
    5.00    0.200
   17.50    1.410
  680.00  529.000
  406.00  207.000
  325.00   85.000
   12.30    0.750
 1320.00   62.000
 5712.00 6654.000
    3.90    3.500
  179.00    6.800
   56.00   35.000
   17.00    4.050
    1.00    0.120
```

```
  0.40    0.023
  0.30    0.010
 12.50    1.400
490.00  250.000
 12.10    2.500
175.00   55.500
157.00  100.000
440.00   52.160
179.50   10.550
  2.40    0.550
 81.00   60.000
 21.00    3.600
 39.20    4.288
  1.90    0.280
  1.20    0.075
  3.00    0.122
  0.33    0.048
180.00  192.000
 25.00    3.000
169.00  160.000
  2.60    0.900
 11.40    1.620
  2.50    0.104
 50.40    4.235
```




```
1st Qu.:   0.600    1st Qu.:   4.25   3rd Qu.:  48.202    3rd Qu.: 166.00
                 1                   1                   1                   1
 Max.   :5712.00   Max.   :6654.000   Mean   : 198.790    Mean   : 283.13
                 1                   1                   1                   1
Median :   3.342    Median :  17.25   Min.   :   0.005    Min.   :   0.10
```

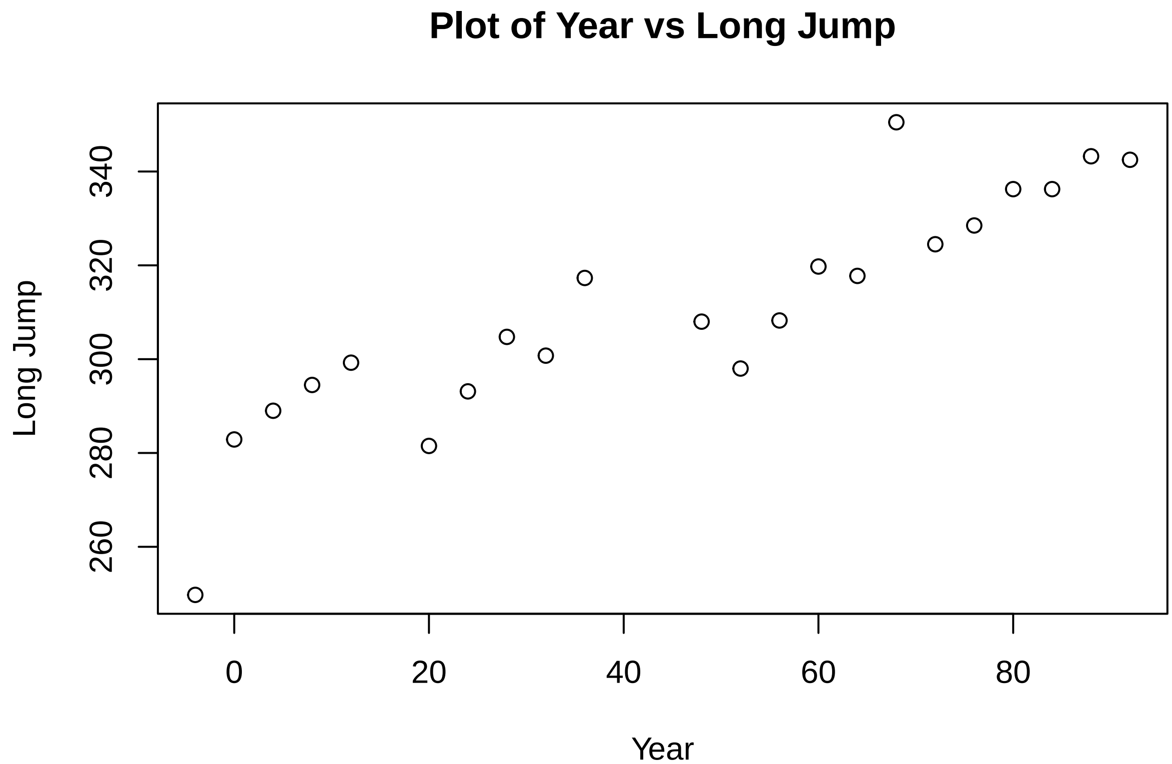
```
1                      1                      1                      1
```

Table 2: Brain and Body Weight in Kilograms of 62 Species

brain.wt	body.wt
44.5	3.385
15.5	0.480
8.1	1.350
423.0	465.000
119.5	36.330
115.0	27.660

c.

```
 Year Long Jump
   -4    249.75
    0    282.88
    4    289.00
    8    294.50
   12    299.25
   20    281.50
   24    293.13
   28    304.75
   32    300.75
   36    317.31
   48    308.00
   52    298.00
   56    308.25
   60    319.75
   64    317.75
   68    350.50
   72    324.50
   76    328.50
   80    336.25
   84    336.25
   88    343.25
   92    342.50
```




```
1st Qu.:21.00   1st Qu.:295.4   3rd Qu.:327.5   3rd Qu.:71.00   Max.   :350.5
              1               1               1               1               1
Max.   :92.00   Mean   :310.3   Mean   :45.45   Median :308.1   Median :50.00
              1               1               1               1               1
Min.   :-4.00   Min.   :249.8
              1               1
```

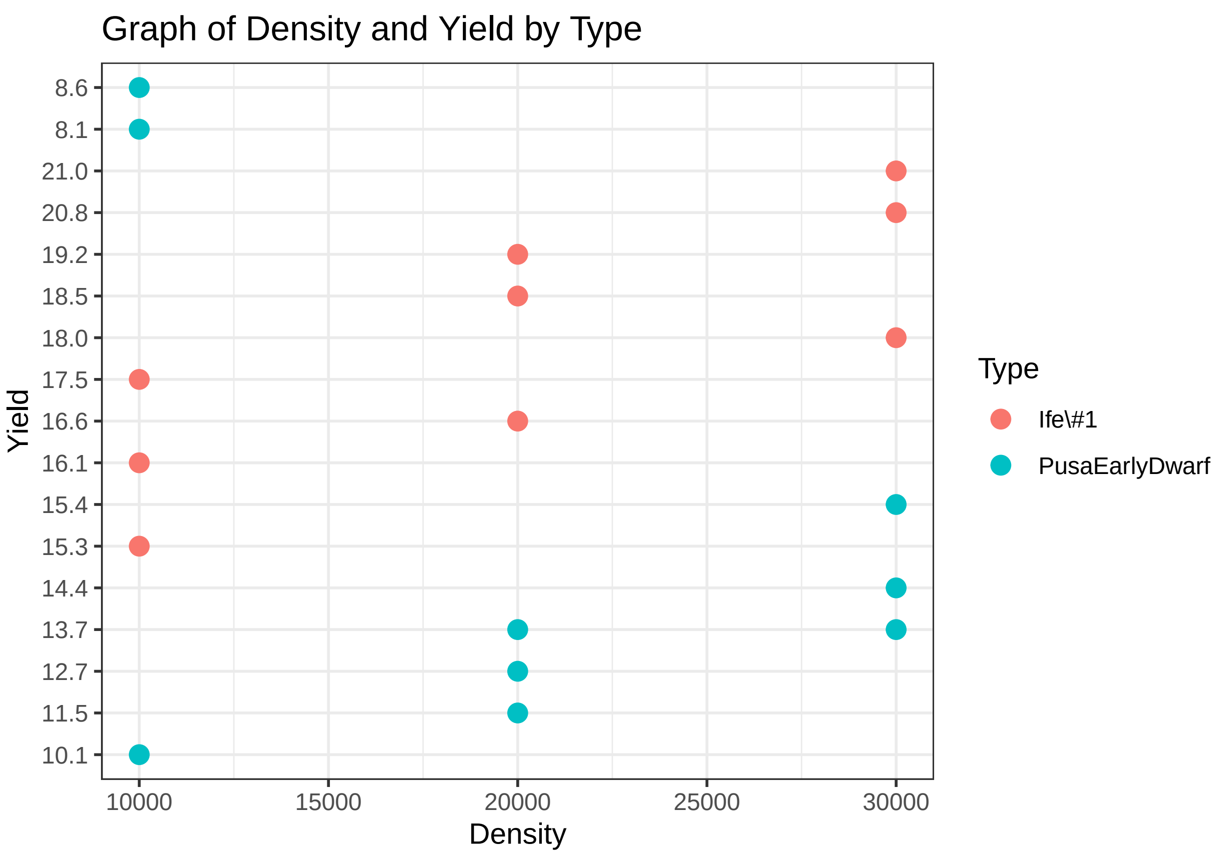
Table 3: Olympic Men Gold Medalist Long Jump

Year	Long Jump
-4	249.75
0	282.88
4	289.00
8	294.50
12	299.25
20	281.50

d.

```
           Type Density Yield
        Ife\\#1   10000  16.1
 PusaEarlyDwarf   10000   8.1
        Ife\\#1   20000  16.6
 PusaEarlyDwarf   20000  12.7
        Ife\\#1   30000  20.8
 PusaEarlyDwarf   30000  14.4
        Ife\\#1   10000  15.3
 PusaEarlyDwarf   10000   8.6
        Ife\\#1   20000  19.2
```

```
PusaEarlyDwarf   20000  13.7
        Ife\\#1   30000  18.0
PusaEarlyDwarf   30000  15.4
        Ife\\#1   10000  17.5
PusaEarlyDwarf   10000  10.1
        Ife\\#1   20000  18.5
PusaEarlyDwarf   20000  11.5
        Ife\\#1   30000  21.0
PusaEarlyDwarf   30000  13.7
```




```
   1st Qu.:10000      3rd Qu.:30000   Class :character    Length:18
                1                 1                  2                2
   Max.   :30000      Mean   :20000      Median :20000      Min.   :10000
                1                 1                  1                1
Mode  :character
                2
```

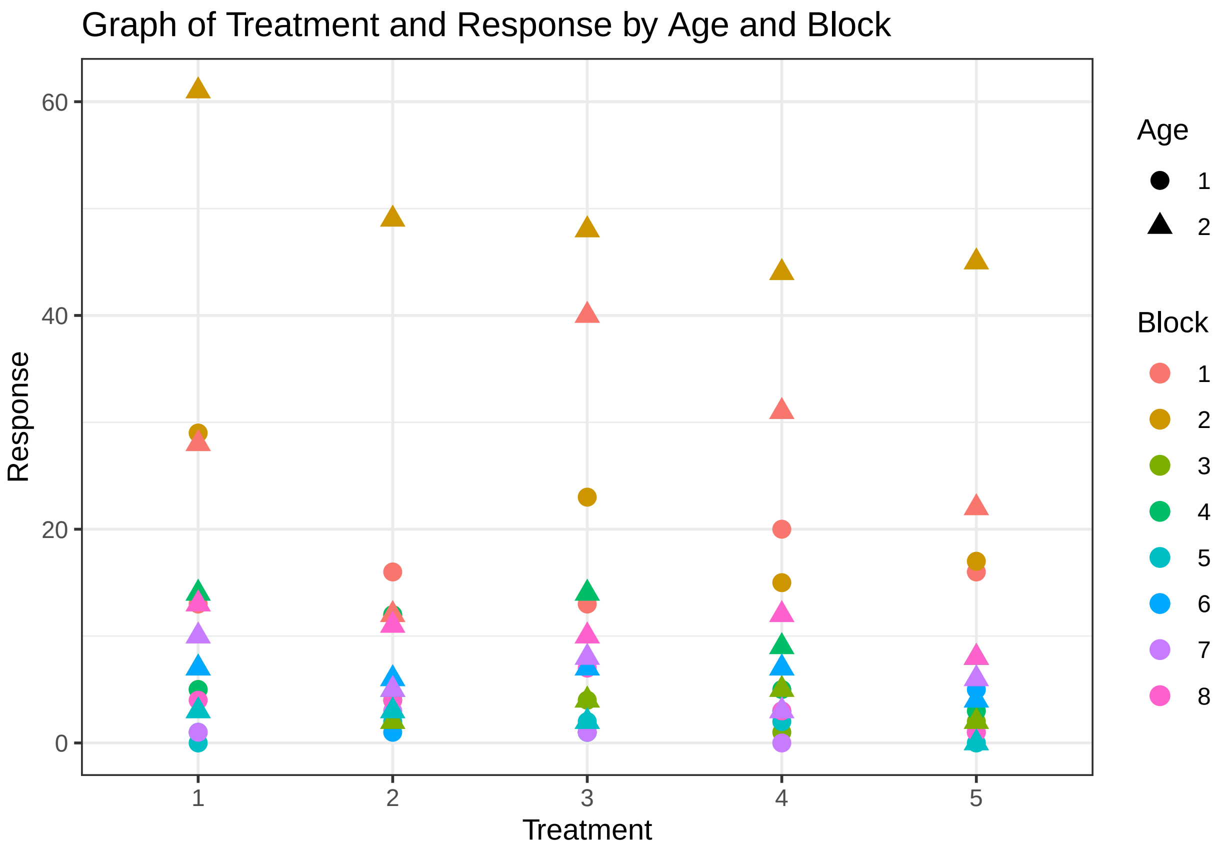
Table 4: Yield of Plant Variety

Type	Density	Yield
Ife#1	10000	16.1
PusaEarlyDwarf	10000	8.1
Ife#1	20000	16.6
PusaEarlyDwarf	20000	12.7
Ife#1	30000	20.8
PusaEarlyDwarf	30000	14.4

e.

Block	Treatment	Age	Response
1	1	1	13
2	1	1	29
3	1	1	5
4	1	1	5
5	1	1	0
6	1	1	1
7	1	1	1
8	1	1	4
1	2	1	16
2	2	1	12
3	2	1	4
4	2	1	12
5	2	1	2
6	2	1	1
7	2	1	3
8	2	1	4
1	3	1	13
2	3	1	23
3	3	1	4
4	3	1	1
5	3	1	2
6	3	1	1
7	3	1	1
8	3	1	7
1	4	1	20
2	4	1	15
3	4	1	1
4	4	1	5
5	4	1	2
6	4	1	3
7	4	1	0
8	4	1	3
1	5	1	16
2	5	1	17
3	5	1	2
4	5	1	3
5	5	1	0
6	5	1	5
7	5	1	1
8	5	1	1
1	1	2	28
2	1	2	61
3	1	2	7
4	1	2	14
5	1	2	3
6	1	2	7
7	1	2	10
8	1	2	13
1	2	2	12
2	2	2	49
3	2	2	2

4	2	2	5
5	2	2	3
6	2	2	6
7	2	2	5
8	2	2	11
1	3	2	40
2	3	2	48
3	3	2	4
4	3	2	14
5	3	2	2
6	3	2	7
7	3	2	8
8	3	2	10
1	4	2	31
2	4	2	44
3	4	2	5
4	4	2	9
5	4	2	7
6	4	2	7
7	4	2	3
8	4	2	12
1	5	2	22
2	5	2	45
3	5	2	2
4	5	2	8
5	5	2	0
6	5	2	4
7	5	2	6
8	5	2	8




```
   (Other):20      1      :10             1:16             1:40    1st Qu.: 2.75
              1               1                1                1                1
   2      :10              2:16             2:40    3      :10             3:16
              1               1                1                1                1
3rd Qu.:13.00      4      :10             4:16    5      :10             5:16
              1               1                1                1                1
   6      :10   Max.   :61.00   Mean   :10.50   Median : 5.50   Min.   : 0.00
              1               1                1                1                1
```

Table 5: Larvae Count for Five Treatments, Eight Blocks, and Two Ages

Block	Treatment	Age	Response
1	1	1	13
2	1	1	29
3	1	1	5
4	1	1	5
5	1	1	0
6	1	1	1

Appendix

```
##a.
library(tidyverse)
library(ggplot2)
# Read in data
parta<-read.csv("https://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/ThicknessGauge.dat",header=FALS
```

```
# Taking only the rows of observations
parta<-slice(parta,3:12)
# Divide data in order to rbind
partao1<-select(parta,c(2,3))
partao1<-data.frame(Response=unlist(partao1))
partao2<-select(parta,c(4,5))
partao2<-data.frame(Response=unlist(partao2))
partao3<-select(parta,c(6,7))
partao3<-data.frame(Response=unlist(partao3))
# rbind
parta<-rbind(partao1,partao2)
parta<-rbind(parta,partao3)
# Add part and operator columns
parta$Part<-rep(1:10,2)
parta$Operator<-c(rep(1,20),rep(2,20),rep(3,20))
parta$Part<-as.factor(parta$Part)
parta$Operator<-as.factor(parta$Operator)
print(parta,row.names=FALSE)
# Plot
ggplot(parta, aes(x=Part,y=Response,color=Operator))+
       geom_point(size=3)+
  theme_bw()+
  ggtitle("Graph of Part and Response by Operator")
# Summary Table
table(summary(parta))
# Kable
knitr::kable(head(parta),caption="Measurements of Wall Thickness by Operator")
##b.
# Read in data
partb<-read.csv("https://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/BrainandBodyWeight.dat", header=
# Ensure it's a data frame
partb<-as.data.frame(partb)
# Name the columns uniquely
names(partb)<-c("body.weight1","brain.weight1","body.weight2","brain.weight2","body.weight3","brain.weig
# Separating brain and body weight
partbbrain<-select(partb, c(2,4,6))
partbbody<-select(partb, c(1,3,5))
# Combining the data
partb<-cbind(partbbrain,partbbody)
# Stacking the brain and body weight
partb<-data.frame(stack(partb[1:3]),stack(partb[4:6]))
# Getting rid of the body weight and brain weight columns
partb<-partb[c(1,3)]
# Renaming finished columns
names(partb)<-c("brain.wt","body.wt")
# Omitting NA row at the bottom
partb<-partb[1:62,]
print(partb,row.names=FALSE)
# Plot
plot(partb,main="Plot of Brain Weight vs Body Weight")
# Summary table
table(summary(partb))
# Kable
```

```
knitr::kable(head(partb),caption="Brain and Body Weight in Kilograms of 62 Species")
##c.
library(data.table)
# Read in data
partc<-fread("https://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/LongJumpData.dat", sep=" ",sep2="
# Get rid of NA columns
partc<-select(partc,where(is.integer),where(is.numeric))
# Separate columns to row bind
partc1<-select(partc,c(Year,Long))
names(partc1)<-c("Year", "Long Jump")
partc2<-select(partc,c(Jump,Year.1))
names(partc2)<-c("Year", "Long Jump")
partc3<-select(partc,c(Long.1,Jump.1))
names(partc3)<-c("Year", "Long Jump")
partc4<-select(partc,c(Year.2,Long.2))
names(partc4)<-c("Year", "Long Jump")
# Row bind
partcrb1<-rbind(partc1,partc2)
partcrb2<-rbind(partcrb1,partc3)
partcrb3<-rbind(partcrb2,partc4)
partc<-as.data.frame(partcrb3)
# Get rid of NA rows
partc<-na.omit(partc)
print(partc,row.names=FALSE)
# Plot
plot(partc,main="Plot of Year vs Long Jump")
# Summary table
table(summary(partc))
# Kable
knitr::kable(head(partc), caption="Olympic Men Gold Medalist Long Jump")
##d.

##e.
# Read in data
parte<-fread("https://www2.isye.gatech.edu/~jeffwu/wuhamadabook/data/LarvaeControl.dat",header=TRUE, sep
parte<-as.data.frame(parte)
# Create treatment and age column
parte<-add_column(parte,Treatment=rep(1,8),.after="Block")
parte<-add_column(parte,Age=rep(1,8),.after="Treatment")
# Select the first set of responses
parte1<-select(parte,1:4)
parte1<-rename(parte1,"Response"="1")
# Create a vector out of the rest of the responses
parte2<-select(parte,5:13)
parte2<-data.frame(Response=unlist(parte2))
# Create block, treatment, and age columns to get ready to row bind
parte2<-add_column(parte2,Block=rep(1:8,9), .before="Response")
parte2<-add_column(parte2,Age=c(rep(1,32),rep(2,40)),.after="Block")
parte2<-add_column(parte2,Treatment=c(rep(2,8),rep(3,8),rep(4,8),rep(5,8),rep(1,8),rep(2,8),rep(3,8),rep
# Row bind to create one data set
parte<-rbind(parte1,parte2)
parte$Age<-as.factor(parte$Age)
parte$Block<-as.factor(parte$Block)
```

```r
parte$Treatment<-as.factor(parte$Treatment)
print(parte,row.names=FALSE)
# Plot
ggplot(parte, aes(x=Treatment,y=Response,color=Block,shape=Age))+
       geom_point(size=3)+
  theme_bw()+
  ggtitle("Graph of Treatment and Response by Age and Block")
# Summary Table
table(summary(parte))
# Kable
knitr::kable(head(parte),caption="Larvae Count for Five Treatments, Eight Blocks, and Two Ages")
```